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Project Abstract

Myopia is corrected using a concave lens while hyperopia uses convex lens system for correction. The lens systems used, optically modifies the magnification of the object seen at a far distance. The concave lenses converge the light rays and reduce the perceived size of the original object whereas the convex lenses diverge the rays, increasing the perceived size of the original object. This occurs with reference to standard vision. A lensmeter can be used to determine the prescription strength (optical power) of unknown lenses using the properties of concave or convex lens. The setup used, utilizes a computer, smartphone (camera), pair of glasses, and a credit card aligned at a fixed distance. The camera is interfaced wirelessly and is controlled using Matlab. The program captures two images: with and without lenses, and equally crops the portion of the credit card seen in the image. The program then converts the captured red-green-blue (RGB) images into binary images where a white area of the credit card is generated. Two binary images are taken: with and without the corrective lenses. The number of pixels covered by each white area is compared to create a ratio between the two binary images. This ratio of magnification and its standard prescription value associated with the glasses is added to a calibration database. A fitting curve and equation are generated for the magnification vs. prescription power. This equation allows the determination of the prescription power of an unknown lens. The use of any smartphone with a fixed distance and the calibration equation, allows an end user to simply determine the unknown prescription of any pair of glasses utilizing a computer.

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